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nexTrans CONSULTING ENGINEERS

NextEng Consulting Group Inc.

December 21, 2023

Studio Limina Inc.
180 Shaw Street, Suite 315
Toronto, ON M6J 2W5

Attention: **Lance Kaprielian**

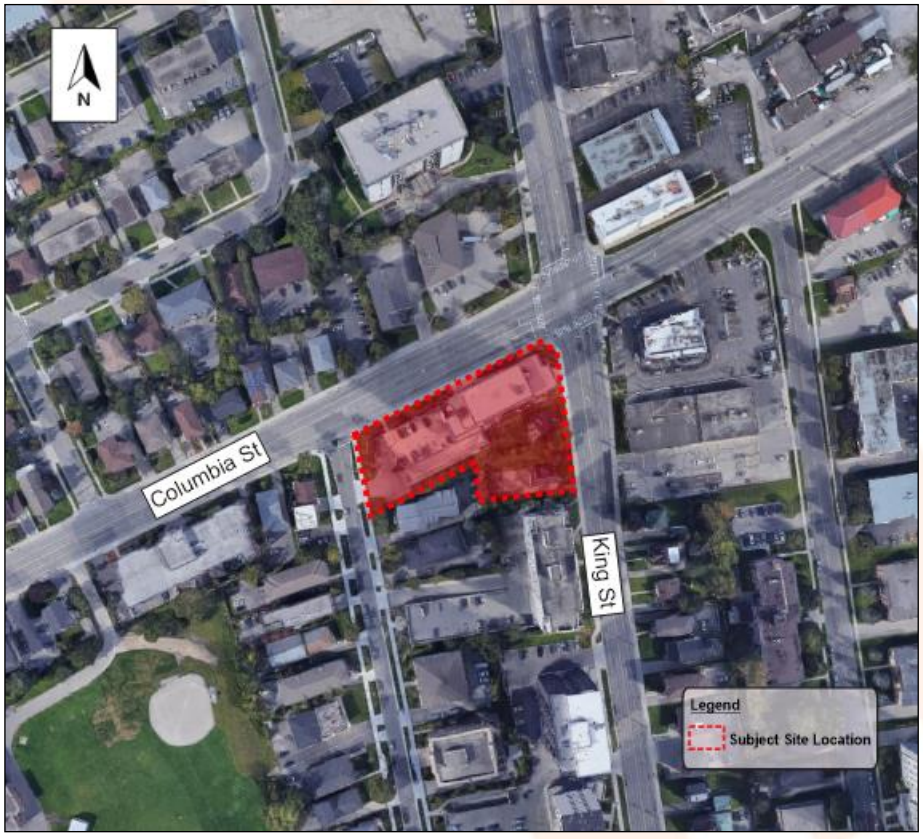
Re: **Traffic Brief and Parking Justification Study**
Proposed Student Residence Expansion
1 Columbia Street West, City of Waterloo
Our Project No. NT-23-036

1.0 INTRODUCTION

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained through Studio Limina Inc. (the 'Client') to prepare a Traffic Brief and Parking Justification Study in support of the Site Plan Application(s) for a proposed student residence expansion. The subject site is located at the southwest corner of the Columbia Street and King Street intersection, municipally addressed as 1 Columbia Street West in the City of Waterloo.

The location of the subject site is illustrated in **Figure 1-1**.

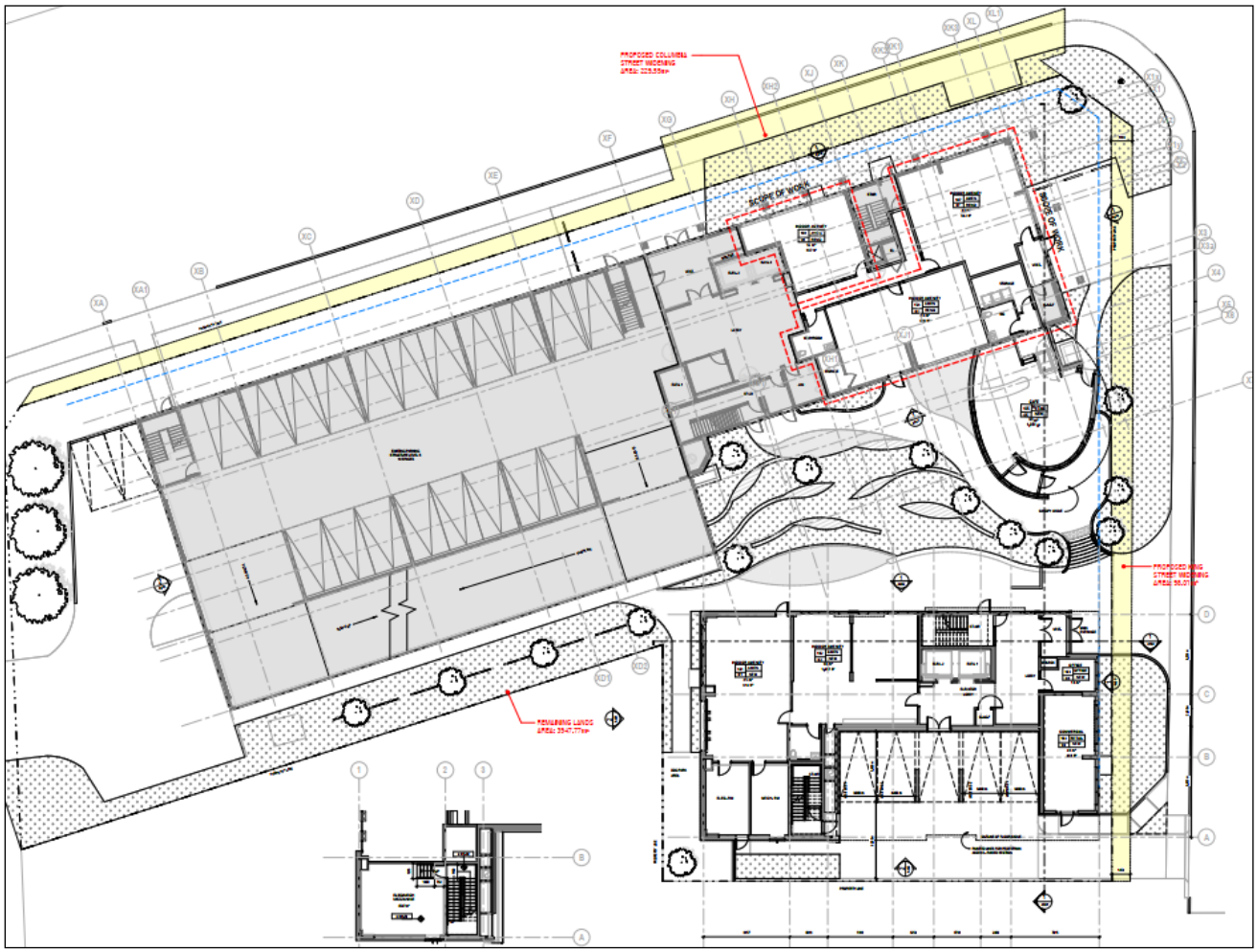
Figure 1-1 – Subject Site Location



The subject property is currently occupied by an existing 22 storey building with 74 residential units (370 bedrooms). Based on the site plan provided by BNKC Architects Inc., the development proposal is to add an additional 11 residential units (22 bedrooms) to the existing 22-storey building and construct a seven (7)-storey residential building with 24 residential units (78 bedrooms) and 168.32 m^2 of commercial use. A total of 97 parking spaces (72 existing parking spaces and 25 additional parking spaces) are proposed for the proposed residential addition.

The proposed site plan is shown in **Figure 1-2**. The complete site plan is provided in **Appendix A**.

Figure 1-2 – Proposed Site Plan



2.0 EXISTING CONDITIONS

2.1 Existing Road Network

The existing road network in the study area is described below:

- **Columbia Street:** An east-west arterial road under the jurisdiction of the City of Waterloo. Within the study area, Columbia Street has a four (4)-lane cross-section (two (2) lanes per travel direction). There is an assumed and unposted speed limit of 50 km/h in the area of the subject site.

- **King Street:** A north-south regional arterial road under the jurisdiction of the Region of Waterloo. King Street has a two (2)-lane cross-section (one (1) lane per travel direction). There is an assumed and unposted speed limit of 50 km/h in the area of the subject site.

2.2 Existing Active Transportation Network

Sidewalks

The area surrounding the subject site is serviced with dedicated walkways. Currently, sidewalks are available as follows:

- Both sides of Columbia Street; and,
- Both sides of King Street.

Sidewalks are adequately maintained, and no improvements are required at this time.

Cycling

The area surrounding the subject site is serviced with dedicated cycling lanes. Currently, cycling lanes are available as follows:

- Both sides of King Street, south of Columbia Street, and,
- Both sides of Columbia Street, west of King Street.

Active transportation provisions are illustrated in **Figure 2-1**.

Figure 2-1 – Existing Active Transportation Facilities



2.3 Transit Assessment

Based on the study prepared by the Ministry of transportation of Ontario (MTO) entitled: 'Transit Supportive Guidelines', dated January 2012, transit users are generally willing to walk 400 meters to a local stop or 800 meters to a transit station. There are currently three (3) bus routes servicing the subject area. Route services in the immediate area are summarized below and are illustrated in **Figure 2-2**.

- **Grand River Transit Route 7 King**: a generally north-south bus route that operates between Fairway Station to the south and Conestoga Station to the north. Route 7 operates all day, everyday with headways of approximately 15-minutes during weekday AM and PM peak periods. The closest bus stop to the subject site is located at the intersection of King Street North and Columbia Street and is a one (1)-minute walk (approximately 65 m) from the subject site.
- **Grand River Transit Route 31 Columbia**: a generally east-west bus route that operates between Conestoga Station to the east and the area of Columbia and Sundew to the west. Route 31 operates all day, everyday with headways of approximately 30-minutes during weekday AM and PM peak periods. The closest bus stop to the subject site is located at the intersection of King Street North and Columbia Street and fronts the subject site.
- **Grand River Transit Route 201 iXpress Fischer-Hallman**: a generally north-south bus route that operates between Conestoga College to the south and Block Line Station to the north. Route 201 operates all day, everyday with headways of approximately 10-minutes during weekday AM and PM peak periods. The closest bus stop to the subject site is located at the intersection of King Street North and Columbia Street and is a one (1)-minute walk (approximately 100 m) from the subject site.

3.0 SITE TRAFFIC

3.1 Site Trip Generation

Anticipated site generated trip rates for the proposed development were calculated using data provided in the Trip Generation Manual, 11th edition published by the Institute of Transportation Engineers (ITE). The existing student residential building was assigned the Land Use Code (LUC) 'Off-Campus Student Apartment (High-Rise) (LUC 227)'. The proposed addition was assigned the LUC 'Off-Campus Student Apartment (High-Rise) (LUC 227) for the addition to the existing student building and the proposed seven (7) storey student residential building was assign the LUC 'Off-Campus Student Apartment (Mid-Rise) (LUC 226)'. The trip generation summary is shown in **Table 3.1**.

Table 3.1 – Site Traffic Trip Generation

Existing							
ITE Land Use	**Parameter**	**Morning Peak Hour**			**Afternoon Peak Hour**		
		In	**Out**	**Total**	**In**	**Out**	**Total**
Off-Campus Student Apartment (High-Rise) *370 Bedrooms*	New Trips	**1**	**3**	**4**	**8**	**7**	**15**
	Trip Rate	0.00	0.01	0.01	0.02	0.02	0.04
Total		**1**	**3**	**4**	**8**	**7**	**15**
Proposed							
ITE Land Use	**Parameter**	**Morning Peak Hour**			**Afternoon Peak Hour**		
		In	**Out**	**Total**	**In**	**Out**	**Total**
Off-Campus Student Apartment (High-Rise) *22 Bedrooms*	New Trips	0	0	0	1	0	1
	Trip Rate	0.00	0.00	0.00	0.05	0.00	0.05
Off-Campus Student Apartment (Mid-Rise) *78 Bedrooms*	New Trips	2	5	7	6	5	11
	Trip Rate	0.03	0.06	0.09	0.08	0.06	0.14
Grand Total		**3**	**8**	**11**	**14**	**12**	**26**
Increase No. of Trips		**+2**	**+5**	**+7**	**+6**	**+5**	**+11**

The site is anticipated to generate an additional seven (7) two-way automobile trips (two (2) inbound and five (5) outbound) during the AM peak period and an additional 11 two-way automobile trips (six (6) inbound and five (5) outbound) during the PM peak period. Based on the anticipated number of site generated vehicle trips, the proposed development is expected to have a negligible impact on the surrounding road network.

4.0 PARKING ASSESSMENT

4.1 Vehicle Parking Requirements

The subject lands are subject to the provisions of the City of Waterloo Zoning By-law 2018-050, zoned as Residential Northdale Twenty-Five (RN-25). The vehicle parking requirements for the proposed development are detailed in **Table 4.1**.

Table 4.1 – Vehicle Parking Requirements (Zoning By-law 2018-050)

Existing					
Use	**By-law Parking Rate**	**No. of Bedrooms**	**Parking Spaces Required**	**Parking Spaces Provided**	**Surplus / Deficit**
Residential	0.20 spaces per bedroom	**370**	74 spaces	**72 spaces**	**-21**
Visitor	0.05 spaces per bedroom		19 spaces		
Total			**93 spaces**		
Proposed					
Residential	0.20 spaces per bedroom	**100**	20 spaces	**25 spaces**	**-4**
Visitor	0.05 spaces per bedroom		5 spaces		
Non-Commercial	2 spaces per 100 m^2 of Floor Area	**168.32 m^2**	4 spaces		
Total			**29 spaces**		
Grand Total		**470**	**122 spaces**	**97 spaces**	**-25**

In accordance with Zoning By-law 2018-050, the proposed site requires 122 vehicular parking spaces. In comparing the parking requirement with the proposed provision of 97 vehicular parking spaces, there is a technical shortfall of 25 vehicular parking spaces.

4.2 Recommended Vehicle Parking Requirement for the Proposed Development

Table 4.2 summarizes the recommended parking rates for the proposed addition, based on the parking justification provided in subsequent sections of this study.

Table 4.2 – Recommended Vehicle Parking Rate for the Proposed Development

Land Use	No. of Units	Proposed Parking Rate	Parking Requirement
Residential	100	0.18 spaces / unit	18
Visitor		0.04 spaces / unit	4
Total			**22**

Based on the recommended vehicle parking rates, the proposed development will provide a total of vehicle parking spaces for student residential housing use (18 spaces), student visitor use (four (4) spaces), for a total of 22 spaces.

The foregoing proposed parking rates for the subject development are recommended based on the following justification.

4.3 Vehicle Parking Provision Justification

4.3.1 Subject Site Strategic Location to Academic Institutions

The subject site is located approximately 1.5 km east of the campus grounds of the University of Waterloo, approximately 800 m west of Conestoga College – Waterloo Campus, approximately 800 m north of the Wilfred Laurier University – Waterloo Campus and approximately 5 km (approximately 20 minute transit ride) north of McMaster University – Waterloo Campus. The proposed residential addition, will be targeted towards the local community, especially given the proximity of the development to the post-secondary institutions of University of Waterloo, Conestoga College, Wilfred Laurier University and McMaster University. With consideration that the residential addition is for student housing aimed for students of the nearby post-secondary institutions, the majority of trips generated for the subject development are expected to be non-auto-based trips including walking, cycling and transit.

4.3.2 Subject Site Strategic Location to Transit Facilities and Active Transportation

The subject site is located at the southwest corner of the Columbia Street West and King Street North intersection. There are three (3) bus routes located at the intersection. The bus routes will provide immediate transit access from the development to the University of Waterloo, Conestoga College, Wilfred Laurier University and McMaster University.

The areas surrounding the subject site are also well serviced by existing active transportation facilities, with a complete network of sidewalk and cycling facilities.

4.3.3 Student Housing – Housing and Rental Affordability

Demand for new housing and rentals is high; especially during and following the COVID-19 pandemic. One component that increases the cost of new units in multi-storey residential buildings is the requirement to provide a minimum rate of parking; even in areas well serviced by transit. The cost of providing one underground parking space is in the range of tens of thousands of dollars per space due to the aggregate impact of land costs, constructability, site constraints and other factors leading to high construction costs.

Furthermore, the more residential or visitor parking spaces that a proposed development has to provide, the more expensive the maintenance costs will be for the owners, in which costs will be passed onto the residential students. Monthly maintenance costs for a parking space could be up to $100 per month, on top of capital costs of a parking space. The provision of less parking can reduce overall maintenance costs and result in lower housing/rental costs and greater housing/rental affordability.

4.3.4 Reduction From Minimum Vehicle Parking Requirements

The reduction (and in some cases, abolition) of minimum parking requirements is consistent with the provincial and City direction.

The Provincial Policy Statement (2020) provides policy direction province-wide on land use planning and development to promote strong communities, a strong economy, and a clean and healthy environment. It includes policies which encourage land use patterns that minimize the length and number of vehicle trips and support current and future use of transit and active transportation.

The City of Waterloo Official Plan (2022) contains policies related to reducing dependence on the automobile and promoting and supporting active transportation and transit. Discouraging auto-dependence requires that there are reasonable

alternatives to cars available. Based on *Schedule A* of the City's Official Plan the subject lands are designated as Mixed-Use High Density Residential and are subject to transit supportive uses as per Section 3.8.1. Section 3.6.6 of the City of Waterloo's Official Plan states that the City *"will plan for reduced reliance on the automobile by implementing transportation demand management and supporting transit and active transportation."* Section 3.6.6. also states that *"Reduced parking standards may be permitted where sharing of parking facilities or areas is feasible, transit service is readily available and/or there is a demonstrated community benefit that supports a parking reduction."* As mentioned previously, the area surrounding the subject site is well serviced by existing transit facilities and existing active transportation facilities, with a complete network of sidewalk and cycling lanes. Widely available automobile parking, mandated by parking minimums, supports continued widespread automobile use and puts the efforts of the City and Province at risk.

4.3.5 Reduce Residential Parking Rates to Reduce Car Ownership and Increase Reliance on Transit Usage and Active Transportation

High vehicle parking rates result in more car ownership and more driving (and traffic congestion) while reducing transit usage.

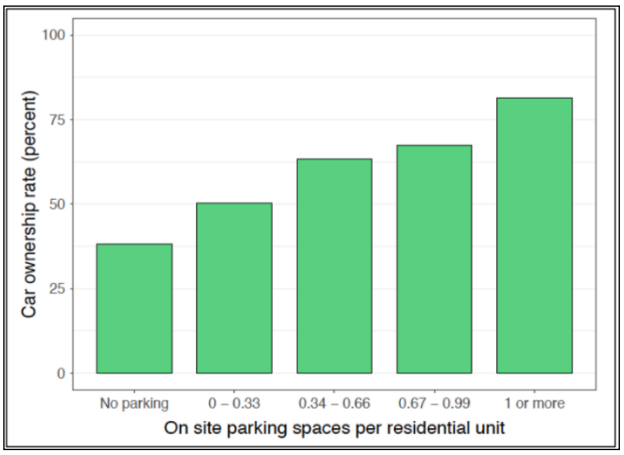
Many municipalities have historically required new development projects to include parking, out of fear that if new developments are not provided with parking, people will park around the local community and this will cause issues. The assumption here, behind both the policy and the pushback on reductions, is that people will always choose to drive, and the urban environment should be designed to accommodate the inevitable choice. But new research shows how that assumption is often backwards – offering the strongest evidence yet that parking doesn't just follow driving in cities but can actually cause it. The new work comes from a group of urban planning scholars at UCLA and UC-Santa Cruz, led by Adam Millard-Ball, and has been published in an issue of the journal Urban Studies. Researchers demonstrated that *"increased parking causes more car ownership and more driving while reducing transit use."* They continue: *"In summary, the evidence from our study robustly supports that urban residents' transportation behavior – but not their employment – is affected by local features of the built environment, and particularly so by parking."* The conclusion underscores the importance of urban design in shaping behavior.

The new study distinguishes itself by finding a way to effectively (and ethically) randomize a population: San Francisco's housing lottery. In San Francisco, inclusionary zoning regulations typically require new developments with 10 or more residential units to provide affordable housing, which is offered to income-eligible households through a lottery. This is the gold standard for showing causation through a randomized trial.

In Spring 2019 (pre-pandemic), the researchers mailed a travel behavior survey to housing lottery winners in 197 development projects across San Francisco. The short questionnaire asked about typical travel mode (car, transit, bike, and walking), car-ownership status, and employment status. Roughly 780 households responded.

When researches matched travel behavior to parking requirements, they found "a clear and substantive trend" as parking supply rose, so did car-ownership. In buildings without any parking, only 38% of respondents owned a car. Car ownership climbed as parking requirements increased, reaching 81% of respondents in buildings that required one parking space per unit. **Figure 4-1** illustrates the survey responses for car ownership by residential parking ratio.\

Figure 4-1 – Survey Responses for Car Ownership by Residential Parking Ratio



Owning a car is not the same as using it, but further analysis found a statistically significant relationship between parking supply and driving, too. Generally speaking, households that lived near public transit, or that had good walking or cycling access, tended to use those options more often than households that did not. But when it came to using transit, in particular, the effect of a building's parking ratio was "more than twice as large" as that of its transit access.

In other words, even in buildings with transit access, parking supply was the stronger pull – increasing driving behavior by the same amount it reduced transit use. When buildings provide ample parking, residents buy a car and drive. But when buildings have transit access without easy parking, residents use other ways to get around.

"Where streets are relatively walkable and transit service is frequent," writes the research team, *"parking emerges as the key factor shaping household travel behavior."*

One final critical result: the researchers found no connection at all between parking supply and full-time employment status. That's very important, because it suggests that reducing or eliminating parking spaces won't negatively impact a household's ability to keep a job, as is often feared.

The study represents a significant step forward for urban mobility policy and offers robust, conclusive and definitive evidence through a controlled study that parking minimums do indeed cause more driving. In alignment with this study, San Francisco eliminated parking minimums. And likewise, supported by this study, San Jose, Cambridge, Massachusetts; Culver City, California; Lexington, Kentucky; and Anchorage, Alaska have all eliminated parking minimums.

Hence, a reduction in vehicular parking for the proposed development will reduce traffic congestion from site-generated traffic volumes and increase transit and active transportation usage, especially for an intensification corridor with a key goal of parking reduction.

4.3.6 Reduction to the Minimum Vehicle Parking Requirements Increases Affordable Housing Supply

Increasing the supply of affordable housing is a Provincial, Regional and City priority. Parking minimums increase the cost of housing, by adding to construction costs which may in turn be passed onto renters. Typical underground parking costs in the hundreds of dollars per square foot. The ability to avoid the cost of parking by choosing housing without parking is limited by the existence of minimum parking requirements. Many municipalities in Ontario, Canada, and abroad have acknowledged that current automobile parking standards represent a barrier to a municipality achieving its housing vision and have recently made decisions to severely reduce and/or eliminate parking minimums in areas well-served by transit, including the following.

City of Toronto

The City of Toronto has recognized that the requirement of excessive parking is a barrier to achieving the City's housing needs and objectives, auto-independence and promoting other modes of transportation such as public transit, walking, and cycling. In March 2022, the City of Toronto Council adopted Zoning By-law amendments that removed the minimum parking requirement for most uses. Instead, the Zoning By-law only speaks to the maximum parking rates that can be applied to a proposed development.

City of Edmonton

In June of 2020, the City of Edmonton Council voted unanimously to change the Zoning By-law with no minimum vehicle parking requirements. Maximum parking requirements will remain in effect downtown and are being expanded in transit-oriented developments and main street areas.

Other Cities in the United States

- City of Buffalo, 2017
- City of Minneapolis, 2021
- City of San Diego, 2021
- City of San Jose, 2022
- City of San Francisco, 2018
- City of Portland, 2023
- City of Berkeley, 2021
- City of Sacramento, 2021
- City of South Bend, 2021
- City of Alameda, 2021
- City of Richmond, 2021
- City of St. Paul, 2021
- City of Emeryville, 2019
- City of Raleigh, 2022
- City of Ann Arbor, 2022
- City of Canandaigua, 2020
- City of Jackson, 2021
- Culvert City, 2022
- City of Dunwoody, 2019

- City of Lexington, 2022
- City of Albemarle, 2021
- City of Hudson, 2019

City of Vaughan

The City of Vaughan Council passed Zoning By-law 001-2021 in October 2021, that includes a reduction in the minimum number of parking spaces required.

City of Ottawa

The City of Ottawa Zoning By-law parking requirements were revised to eliminate minimum parking requirements for developments within 600 meters of an LRT station, and similar to the City of Toronto, it adopts a maximum allowable parking rate for new developments. This is to support the new major transit investment of the Confederation Line which opened in December 2019 and services through the downtown area.

City of Brampton

The City of Brampton has adopted Zoning By-law Amendment No. 45-2021 to Zoning By-law No. 270-2004 for the Downtown, Central Area, and Hurontario/Main Street Corridor. The By-law states that, notwithstanding any minimum parking requirement prescribed in Sections 10.9.2(a), 10.9.3, 20.3.1 and 30.5, there shall be no minimum required parking for any use within the boundaries of the affected areas.

Summary of Reduced Minimum Parking Requirements in Zoning By-laws

Nextrans recommends the proposed new development have a lower parking rate, similar to the aforementioned municipalities and areas.

The municipalities that have severely reduced and/or removed parking minimums have not re-imposed them, noting that they have been successful. They have found that the reduction to the minimum automobile parking requirements does not remove or prohibit parking in new developments but rather recognizes that parking minimums embedded in their prevailing Zoning By-laws may not be nuanced enough or be updated frequently enough to be applicable in all situations. Equitable access, including accessible parking, can still be maintained.

4.3.7 General Benefits to the Reduction of Minimum Parking Requirements

A reduction in the minimum parking requirements which decreases vehicle trips and increases transit usage (as proven via the UCLA study previously noted) also provides the following benefits:

- Reduced traffic congestion in the area
- Reduced GHG emissions
- Safer streets for all road users, other drivers, bicyclists, pedestrians. Theoretically, the more bikes there are, the more drivers are aware of bikes on the road and can coexist safely with cyclists.

4.3.8 Conclusion Vehicle Parking Rate Reduction Justification

Based on the comprehensive justifications provided above, it is concluded that reduction to the student housing parking rates is justified, desirable and would support a more equitable, balanced multi-modal transportation network.

The proposed parking rate reductions wouid be consistent with the PPS, the Official Plan and the approaches followed by many municipalities in Ontario. In particular, the experience in these other cited municipalities demonstrates that automobile parking minimums can be eliminated and still achieve Official Plan policies which require adequate or sufficient parking off-street or on-site.

Given these considerations, the proposed reduction to the minimum automobile parking requirements is justified, desirable and will better support the City's vision to: create compact complete communities, encourage transportation alternatives to automobiles be consistent with policies aimed at reducing auto-dependence support, and encourage land- and cost-efficient forms provide for efficient use of land next to existing and planned transit.

4.4 Bicycle Parking Review

The proposed addition is subject to the bicycle parking requirements of the City of Waterloo Zoning By-law 2018-050.

A summary of the proposed bicycle parking supply for the subject site is provided in **Table 4.3**.

Table 4.3 – Summary of Bicycle Parking Supply Requirements

Use	Bedrooms / Floor Area	Zoning By-law		Proposed Bicycle Parking Supply	Variance (+/-)
		Bicycle Parking Rate	Required Bicycle Parking		
Residential	470 bedrooms	0.25 spaces / bedroom	118	**120**	**-**
Non-Residential	168.32 m^2	1 space / 100 m^2 of floor area	2		
Total	**-**	**-**	**120**		

Based on bicycle parking rates provided in the City of Waterloo Zoning By-law 2018-050, a minimum of 120 bicycle parking spaces is required.

The proposed development will provide an overall proposed bicycle parking provision of 120 bicycle parking spaces and meets the bicycle parking requirements stated in the City of Waterloo Zoning By-law 2018-050.

5.0 SITE PLAN REVIEW

5.1. Site Circulation

AutoTURN was used to generate a vehicular turning template to confirm the accessibility of the proposed development. AutoTURN analysis demonstrates that a passenger vehicle (P TAC 2017) can access the parking garage and proposed surface lot without conflict. Vehicle turning diagrams are shown in **Figure 5-1** and **Figure 5-2**.

6.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a set of strategies that strive towards a more efficient transportation network by influencing travel behaviour and patterns. Efficient implementation of TDM strategies can reduce vehicle usage and encourage people to engage in more sustainable modes of travel. In addition to the active transportation and transit networks discussed under **Section 2**, there are several opportunities to incorporate TDM measures that support alternative modes of travel. The recommendations should enhance non-single occupant auto vehicle trips for the future residents and visitors of the subject development. These TDM strategies are critical in achieving a balanced multi-modal transportation system. A variety of multi-modal infrastructure strategies and TDM measures have been detailed below.

6.1 Pedestrian Based Strategies

Ensure convenient pedestrian connections to existing and future surrounding amenities and transit facilities in the vicinity of the subject site.

Pedestrian pathways provide direct connection from the subject site to the existing sidewalks along Columbia Street and King Street. Pedestrian sidewalks provide convenient access to existing bus routes which provide direct access to the many post secondary institutions within the City.

Building entrances located within proximity to street.

The proposed development has a number of building entrances that will be located immediately to the frontage along King Street North. This will provide convenient access for pedestrians, transit users, and cyclists.

To further enhance the pedestrian realm and consider persons with mobility difficulties, all entranceways are recommended to be well list with enhanced landscaping and minimal barriers to provide a clear pedestrian corridor.

6.2 Cycling Based Strategies

Connection to the cycling network.

The frontage of the proposed development is footsteps from Columbia Street and King Street, where cyclists will have direct connection to dedicated cycling lanes along Columbia Street and King Street. The active transportation infrastructure within the broader area surrounding the subject site will encourage student residents, and visitors to travel via cycling.

Promote and increase cycling awareness & multi-modal transportation.

It is recommended that information packages be provided to student residents to help encourage active transportation and increase awareness of different travel alternatives. The package should include information regarding the environmental

and health benefits of cycling, rules of the road, and maps of existing active infrastructure in the surrounding and broader area. The information packages can be provided digitally via online website or by email.

Provision of bicycle parking.

The provision of bicycle parking facilities will support and encourage active transportation, while taking advantage of the existing cycling infrastructure surrounding the subject site. Bicycle parking facilities are proposed on surface level.

6.3 Transit Based Strategies

Connection to existing and future transit network.

As noted in **Section 2**, the subject site is located immediate to bus transit services operated by Grand River Transit along King Street and Columbia Street. The existing transit network will encourage student residents and visitors to use transit as an alternative means of transportation.

Communication Strategy.

In order for residents to take advantage of the transit services surrounding the subject site, it is recommended that information packages be provided to new student residents to increase transit awareness and multi-modal transportation. Public transit information such as route maps and schedule timetables should be made available to residents of the building. Information packages, including mobile apps and websites which show real-time route and scheduling information, can be communicated to residents digitally.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of this Traffic Brief and Parking Justification Study are summarized as follows:

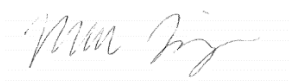
- The site is anticipated to generate an additional seven (7) two-way automobile trips (two (2) inbound and five (5) outbound) during the AM peak period and an additional 11 two-way automobile trips (six (6) inbound and five (5) outbound) during the PM peak period. Based on the anticipated number of site generated vehicle trips, the proposed development is expected to have a negligible impact on the surrounding road network.
- Nextrans recommends a lower vehicular parking rate from Zoning By-law 2018-050 given that the development will serve student residents who will mostly use alternative modes of transportation such as transit, cycling and walking to the surrounding amenities and the post-secondary institutions surrounding the subject site.
- AutoTURN was used to generate a vehicular turning template to confirm the accessibility of the proposed development. AutoTURN analysis demonstrates that a passenger vehicle (P TAC 2017) can access the parking garage and proposed surface lot without conflict.

We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

Nextrans Consulting Engineers
A Division of NextEng Consulting Group Inc.

Prepared by:

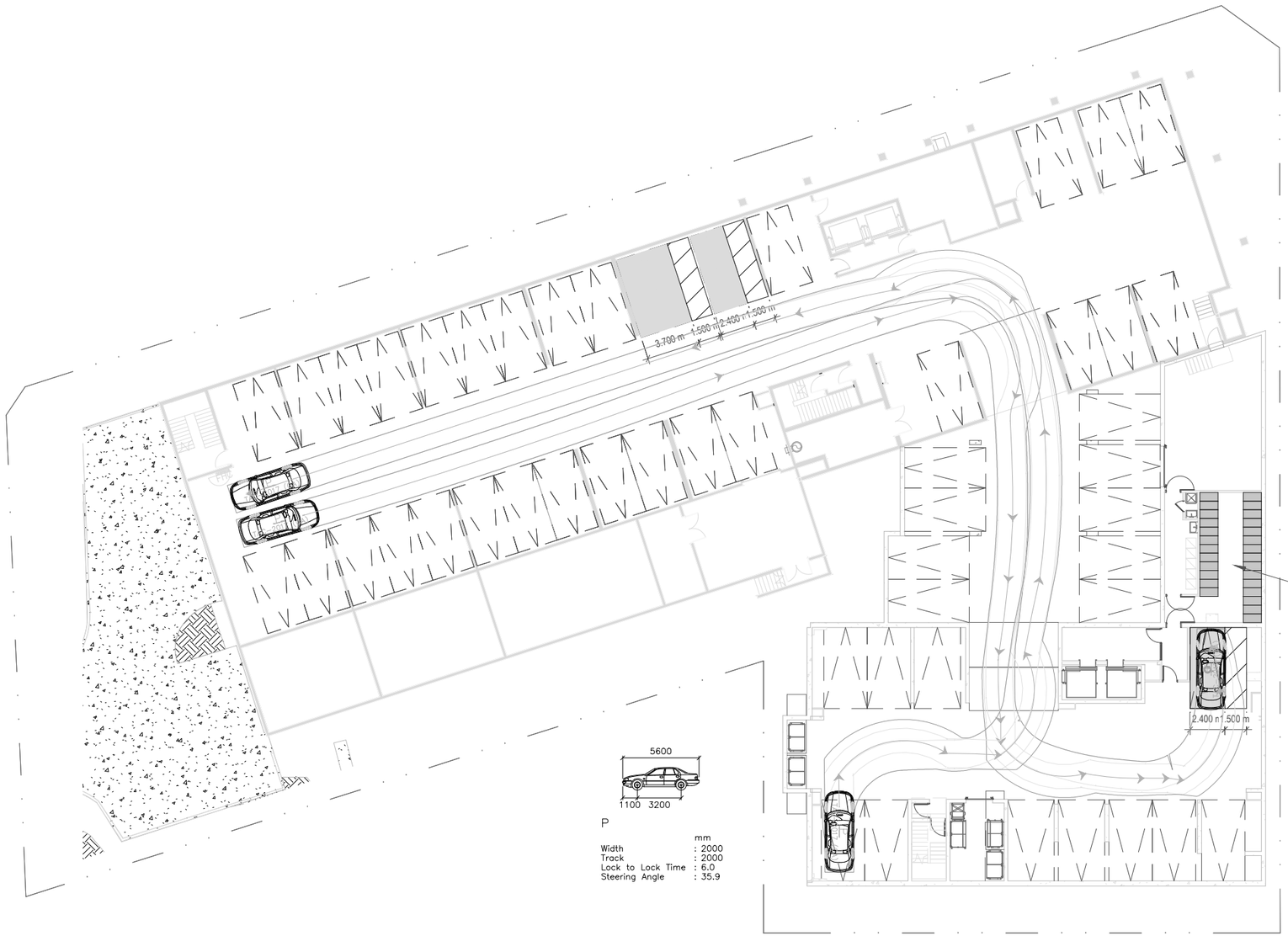


Marc Dimayuga
Transportation Analyst

Approved by:



Richard Pernicky, MITE
Principal



KEY PLAN

BENCHMARK

REVISONS

NO	REVISION	DATE	BY

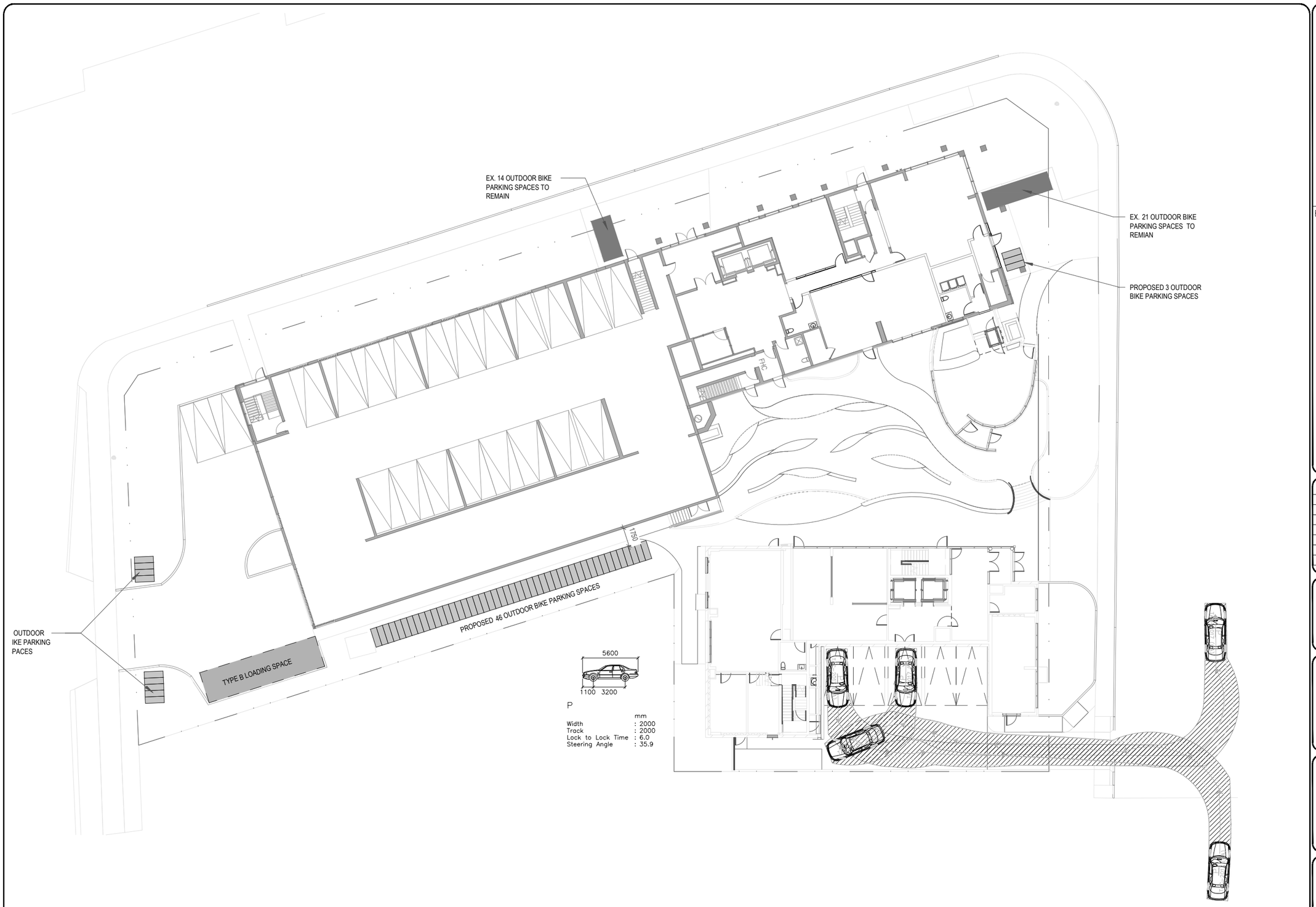
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nexTrans
CONSULTING ENGINEERS
Suite 201, 520 Industrial Parkway South
Aurora ON L4G 6W8
Tel: 905-503-2563
Web: www.nextrans.ca

PROJECT NAME:
Student Housing Addition
1 Columbia Street West
City of Waterloo

DRAWING TITLE:
AutoTURN Analysis
P TAC-2017

DESIGN BY: M.D.	DATE: December 20, 2023
CHECKED BY: R.P.	PROJECT NO. NT-23-036
DRAWN BY: M.D.	DRAWING NO. Figure 5-1
SCALE: NTS	



KEY PLAN

BENCHMARK

REVISONS

NO	REVISION	DATE	BY

STAMP

nexTrans
CONSULTING ENGINEERS
Suite 201, 520 Industrial Parkway South
Aurora ON L4G 6W8
Tel: 905-503-2563
Web: www.nextrans.ca

PROJECT NAME:
Student Housing Addition
1 Columbia Street West
City of Waterloo

DRAWING TITLE:
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P TAC-2017

DESIGN BY: M.D.	DATE: December 20, 2023
CHECKED BY: R.P.	PROJECT NO. NT-23-036
DRAWN BY: M.D.	
SCALE: NTS	DRAWING NO. Figure 5-2

Appendix A - Proposed Site Plan

Site Data Chart

Site Information: 1 Columbia Street West, Waterloo, Ontario

	Required	Existing Condition / Building	Revised / Modified Building	Proposed New Building	Combined Modified Existing & Proposed
Lot Area	**1,000m² min.**	**2,965m² (0.296ha Old Net Lot Area After Road Widening)**	**N/A**	**982.77m² (0.098ha New Lot Area After Road Widening)**	**3,947.77m² (0.3948 ha Net Lot Area After Road Widening)** **• Road Conveyance Area @ Columbia St W: 229.55 m2** **• Road Conveyance Area @ King St N: 98.01 m2** **• Total Lot Area Before Road Widening: 4275.33 m2**

CITY OF WATERLOO
REGIONAL MUNICIPALITY OF WATERLOO
ZONING: RESIDENTIAL NORTHDALE TWENTY FIVE (RN-25) , By-law 2018-050

Setback	Required	Existing Condition / Building	Revised / Modified Building	Proposed New Building	Combined Modified Existing & Proposed
Street Line Setback	Active Frontage (Columbia St W): 1m min.	5m	Existing to Retain	No Change proposed	N/A
	Active Frontage (King St N): 1m min.	5m	Existing to Retain	1m	N/A
	Neighbourhood Frontage (Spruce St): 3m min.	5m	Existing to Retain	No Change proposed	N/A
Side Yard Setback	3m min.	N/A	N/A	3m	N/A
Rear Yard Setback*	7.5m min.	5m	Existing to Retain	*3.25m	N/A

Lot Info	Required	Existing Condition / Building	Revised / Modified Building	Proposed New Building	Combined Modified Existing & Proposed
Lot Frontage	min. 20m	N/A	N/A	N/A	Active Frontage (Columbia St W): 92m Active Frontage (King St N): 60.9m Neighbourhood Frontage (Spruce St): 34.8m
Number of First Storey Entrances to the Building	Active Frontage (King, Columbia): 1 per 25m Neighbourhood Frontage (Spruce): 1 per 15m	Active Frontage (Columbia): 2 Active Frontage (King): 1 Neighbourhood Frontage (Spruce): 0	Active Frontage (Columbia): 2 Active Frontage (King): 1	Active Frontage (King): 1	Active Frontage (Columbia): 2 Active Frontage (King): 2 Neighbourhood Frontage (Spruce): 0
Number of Driveways per Lot*	max. 1	1	Existing to Remain	1	*2
Diverway Width*	min. 6.1m max. 7m	6.1m	Existing to Remain	Surface Driveway: 3.55m Underground Driveway: 6.1m – 6.6m *Driveway leading to Parking Level A: 5.9m	N/A

Building Height	Required	Existing Condition / Building	Revised / Modified Building	Proposed New Building	Combined Modified Existing & Proposed
Building Height	82.5m max.	68.936m	Existing to Remain	25.35m	N/A
Height of First Storey	4m min.	3.915m	Existing to Remain	5.95m Cafe Ceiling HT = 4.2m	N/A
Number of Storeys	N/A	22 storeys	Existing to Remain	7 storeys	N/A

Density	Required	Existing Condition / Building	Revised / Modified Building	Proposed New Building	Combined Modified Existing & Proposed
Bedroom Density	1,105 bedrooms per hectare max. As per Minor Variance decision A-76/15 1105 x 0.3948 = 436.25 bedrooms	370 bedrooms	Added 22 new bedrooms	78 bedrooms	470 Bedrooms (100 new bedrooms) 470/0.3948 = 1190 bedrooms
Units Density	N/A	74 Units: 5-Bedroom suite x 74 = 370	Added 11 new units: Bachelor suite x 2 1-Bedroom suite x 3 2-Bedroom suite x 2 3-Bedroom suite x 3 4-Bedroom suite x 1	24 units: 2-Bedroom suite x 6 3-Bedroom suite x 6 4-Bedroom suite x 12	109 Units (35 new units)

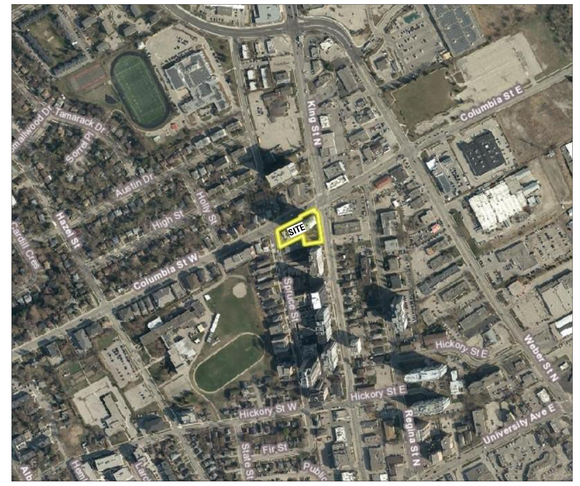
Amenity Area	Required	Existing Condition / Building	Revised / Modified Building	Proposed New Building	Combined Modified Existing & Proposed
	3 m² for the first bedroom and 2 m² for each additional bedroom in the dwelling unit Total Required for both existing and new: 237.73 + 235 = 472.73 m²	Total Existing: 237.73 m² (2nd Floor Media Room - 32.78 m² 22nd Floor Game Room - 40.36 m² 22nd Floor Gym - 91.77 m² 22nd Floor Patio - 72.82)	Total Proposed indoor amenity: 348.6 m² (including existing remained)	Total Proposed indoor amenity: 182.2 m² Required for new proposed only: 3x24 + 2x(78-24) = 180 m²	Total Proposed indoor amenity: 530.8 m² Required for 35 new units (100 new bedrooms): 35x3 + 2x(100-35) = 235 m²
		Existing outdoor amenity area - 6.7 m²	N/A	Outdoor amenity area - 181.3 m²	Outdoor amenity area - 188 m²
		Total existing - 244.43 m²	N/A	Total proposed - 363.5 m²	Total proposed - 718.8 m²
Common Amenity Area	min. 30% of required Amenity Area are designed, intended and accessible to all residents of the Building	164.91m² (69% accessible)	275.8 m² (79% accessible)	182.2 m² (100% accessible)	458 m² (86% accessible of indoor amenity)
Amenity Space on the First Storey*	common indoor AMENITY AREA shall not be permitted on the FIRST STOREY	0	222.5 m² on Ground Floor	182.2 m² on Ground Floor	*404.7 m² on Ground Floor

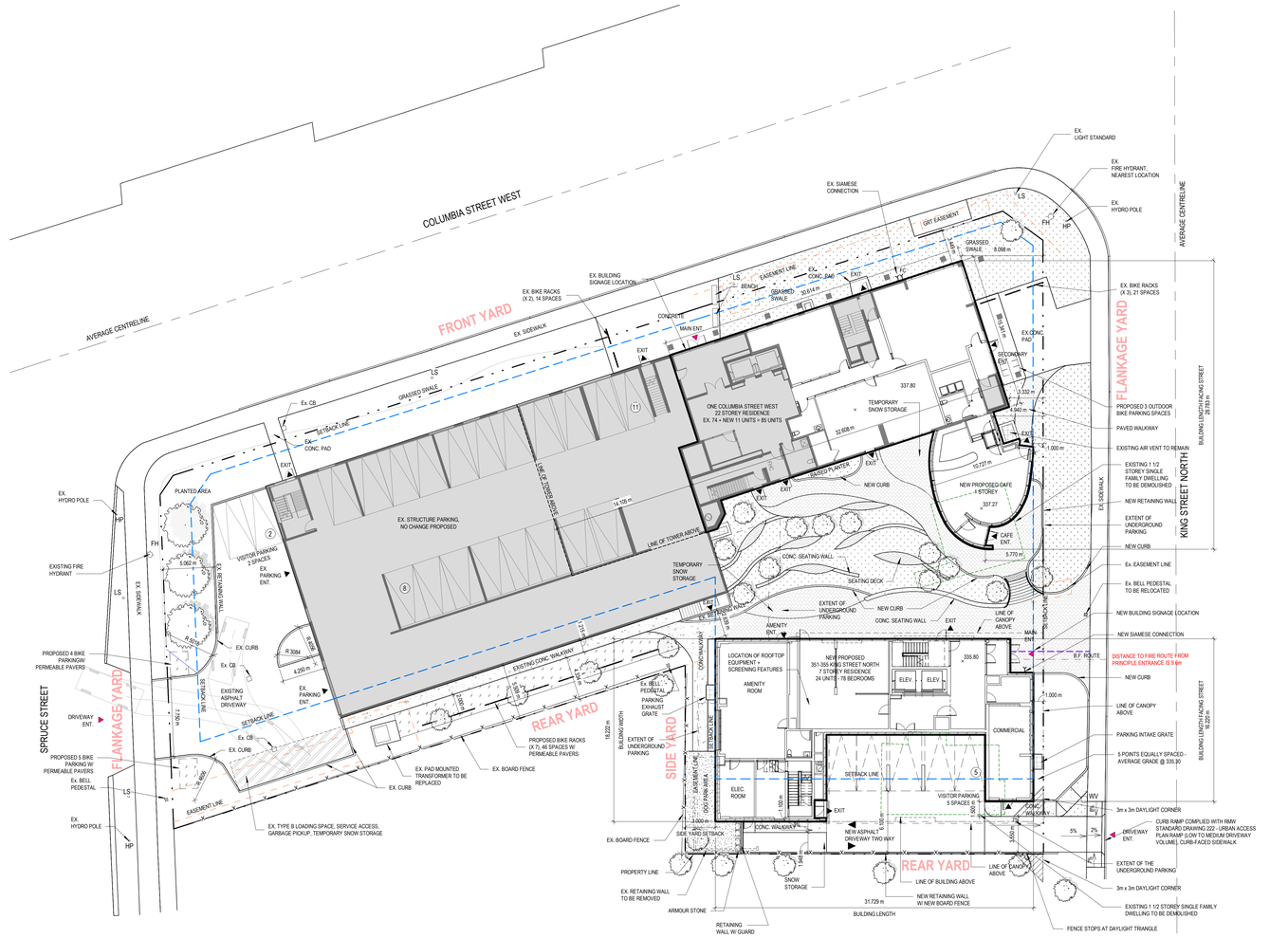
Landscape Area	Required	Existing Condition / Building	Revised / Modified Building	Proposed New Building	Combined Modified Existing & Proposed
Landscape Open Space	min. 30% of Lot Area 3947.77 m² x 30% = 1184.3 m²	N/A	N/A	N/A	Total Landscape Open Area: 1395.9m² (35.4%)

Parking	Required	Existing Condition / Building	Revised / Modified Building	Proposed New Building	Combined Modified Existing & Proposed
Residential Parking Rate	0.2 per bedroom	74 spaces in total: 20 spaces on level C (second floor) 19 spaces on level B (ground floor) 35 on level A (basement, include 2 surface parking)	Required for additional bedrooms: 22 added bedrooms = 5 additional parking spaces. (392 bedrooms requires 79 resident parking spaces)	Required for additional bedrooms: 78 added bedrooms = 16 additional parking spaces.	470 bedrooms requires 94 resident parking spaces Required: 470 x 0.2 = 94
Visitor Parking Rate	0.05 per bedroom		Required for additional bedrooms: 22 added bedrooms = 2 additional parking spaces. (392 bedrooms requires 20 visitor parking spaces)	Required for additional bedrooms: 78 added bedrooms = 4 additional parking spaces.	470 bedrooms requires 24 visitor parking spacesRequired: 470 x 0.05 = 24
Parking Spaces for Non-Residential Uses	2 per 100 m² of building floor area	0	0	168..32 x 0.02 = 4 4 spaces for commercial	4 spaces for commercial
Accessible Car Parking Spaces	1 Type 'A' space for 1 to 25 spaces: add to this one Type 'B' space for 26-50 spaces; add one Type 'B' for 51-75 spaces; add one Type 'A' for 76 to 100; add one Type 'B' for 101-133	current accessible spaces = 4 (included in total of 74 spaces, 3 Type A + 1 Type B)	Application of current bylaw to existing building: 99 parking spaces 2 each of type 'A' and 'B'. TOTAL = 4	Required by current bylaw for additional bedrooms: 23 parking spaces = 1 Type 'A' added.	Application of current bylaw to full site: TOTAL = 5 3 Type 'A' spaces 2 Type 'B' spaces
Electric charging Car Parking Spaces	ALL structure parking spaces to be electric vehicle parking spaces	N/A	applies to new spaces only: none	applies to new spaces only: 20 electric charge stations required	applies to new spaces only: 20 electric charge stations required
Total Required			99 spaces (includes 4 accessible spaces)	23 spaces (includes 1 accessible space + 20 electrical stations)	122 spaces (includes 5 accessible spaces + 20 electrical charge stations)
Total Provided			74 - 2 (removed) = 72 spaces	25 spaces in total: 20 tenant spaces underground 5 visitor spaces on grade 1 Type 'B' accessible space proposed (inclusive) 20 electrical charge stations (inclusive)	*97 spaces in total 5 accessible spaces in total (inclusive 3 Type 'A' spaces 2 Type 'B' spaces) 20 electrical charge stations (inclusive)
Bicycle Parking	Residential: 0.25 per bedroom	current parking = 150 spaces in total 76 indoor 48 outdoor, south of the building 26 outdoor, at King and Columbia entrances	Required for additional bedrooms: 22 bedrooms = 6 spaces (392 bedrooms requires 98 bicycle parking spaces)	Required for additional bedrooms: 78 bedrooms = 20 spaces 78 x 0.25 = 20	470 bedrooms requires 118 spaces 0.25x470 = 118
	Non-Residential: 1 per 100 m² of building floor area	0	0	168.32 x 0.01 = 2 2 required for commercial	2 required for commercial
Total Required			98	20 spaces+2 = 22 spaces	120 spaces
Total Provided			Existing 35 outdoor spaces to be remained	27 indoor bike parking spaces 58 outdoor bike parking spaces	120 spaces (27 indoor + 93 outdoor)

Loading	Required	Existing Condition / Building	Revised / Modified Building	Proposed New Building	Combined Modified Existing & Proposed
Loading Residential	0 – 75 bedrooms: none required 76 – 900 bedrooms: 1 type A (3m x 7m x H 3m)	1 type B	Existing to Remain	0	1
Loading Non-Residential	0 – 249 m²: none required	0	0	0	0

Building Data	Required	Existing Condition / Building	Revised / Modified Building	Proposed New Building	Combined Modified Existing & Proposed
Building Floor Area	The gross floor area of a BUILDING measured between the outside of all exterior walls; Excludes STRUCTURED PARKING.	Gross Floor Area 16031.9 m²	Existing to Remain	Gross Floor Area 3873 m²	19904.9 m²
Building Floor Area Breakdown (Calculation based on definition in Waterloo Zoning By-law 2018-050)		P1 Level Area 1593.2 m²		P1 Level Area 1001.5 m²	Total P1 Level Area 2594.7 m²
		Ground Floor Area 490m²		Ground Floor - New Proposed Student Residence 423 m²; Café: 98 m² = 521m²	Total Ground Floorl Area 1011m²
		2nd - 3rd Floor Area 490 m²		2nd - 7th Floor Area 575 m²	N/A
		4 - 21 Floor Area 773.2 m²			
		22 Floor Area 644.1 m²			
Ancillary Uses	Ancillary uses shall not collectively exceed 15% of the building floor area on the lot or 5,000 m², whichever is more restrictive The maximum building floor area of each Retail Store, Café, Bake Shop, or Restaurant (including take-out restaurant) shall not exceed 465 m²	0	23.01	145.31m²	168.32 m²
*Active Frontage	BUILDING FLOOR AREA devoted to: • circulation spaces, such as hallways, elevators, and the like • common indoor AMENITY AREA • entrance / foyers for DWELLING UNITS in storeys above the FIRST STOREY • hydro transformer room • lobby, reception area, seating area, and the like shall not exceed thirty percent (30%)	Ground Floor 490 m²	Existing to Remain	Ground Floor - New Proposed Student Residence: 423 m² + Café: 98 m² = 521m²	1011 m²
		470.6m² (*96%)	405.2m² (*82.7%)	295.3 m² (*56.7%)	700.48 m² (*69%)




COLUMBIA STREET WEST
AVERAGE CENTRELINE
FRONT YARD
EX. SIDEWALK
EX. BIKE RACKS (X 2), 14 SPACES
EX. BUILDING SIGNAGE LOCATION
CONCRETE
MAIN ENT.
EXIT
LS
EASEMENT LINE
EX. CONC. PAD
GRASSED SWALE
30.614 m
GRASSED SWALE
8.098 m
GRT EASEMENT
EX. LIGHT STANDARD
EX. FIRE HYDRANT, NEAREST LOCATION
EX. HYDRO POLE
EX. SIAMESE CONNECTION
AVERAGE CENTRELINE
EX. BIKE RACKS (X 3), 21 SPACES
FLANKAGE YARD
PROPOSED 3 OUTDOOR BIKE PARKING SPACES
PAVED WALKWAY
EXISTING AIR VENT TO REMAIN
EXISTING 1 1/2 STOREY SINGLE FAMILY DWELLING TO BE DEMOLISHED
NEW RETAINING WALL
EXTENT OF UNDERGROUND PARKING
NEW CURB
Ex. EASEMENT LINE
Ex. BELL PEDESTAL TO BE RELOCATED
NEW BUILDING SIGNAGE LOCATION
NEW SIAMESE CONNECTION
KING STREET NORTH
BUILDING LENGTH FACING STREET 39.78 m
ONE COLUMBIA STREET WEST
22 STOREY RESIDENCE
EX. 74 + NEW 11 UNITS = 85 UNITS
EX. STRUCTURE PARKING, NO CHANGE PROPOSED
LINE OF TOWER ABOVE
TEMPORARY SNOW STORAGE
RAISED PLANTER
NEW CURB
NEW PROPOSED CAFE
1 STOREY
337.27
CAFE ENT.
5.770 m
CONC. SEATING WALL
SEATING DECK
EXTENT OF UNDERGROUND PARKING
NEW CURB
CONC. SEATING WALL
EXIT
LINE OF CANOPY ABOVE
AMENITY ENT.
MAIN ENT.
LOCATION OF ROOFTOP EQUIPMENT + SCREENING FEATURES
AMENITY ROOM
NEW PROPOSED 351-355 KING STREET NORTH 7 STOREY RESIDENCE 24 UNITS - 78 BEDROOMS
ELEV.
ELEV.
335.80
B.F. ROUTE
DISTANCE TO FIRE ROUTE FROM PRINCIPLE ENTRANCE IS 9 m
NEW CURB
1.000 m
LINE OF CANOPY ABOVE
PARKING INTAKE GRATE
5 POINTS EQUALLY SPACED - AVERAGE GRADE @ 335.30
BUILDING LENGTH FACING STREET 16.229 m
COMMERCIAL
SETBACK LINE
VISITOR PARKING 5 SPACES
5
3m x 3m DAYLIGHT CORNER
CURB RAMP COMPLIED WITH RMW STANDARD DRAWING 222 - URBAN ACCESS PLAN RAMP (LOW TO MEDIUM DRIVEWAY VOLUME), CURB-FACED SIDEWALK
DRIVEWAY ENT.
5%
2%
EXTENT OF THE UNDERGROUND PARKING
3m x 3m DAYLIGHT CORNER
EXISTING 1 1/2 STOREY SINGLE FAMILY DWELLING TO BE DEMOLISHED
FENCE STOPS AT DAYLIGHT TRIANGLE
SIDE YARD
REAR YARD
SIDE YARD SETBACK
EX. BOARD FENCE
PROPERTY LINE
EX. RETAINING WALL TO BE REMOVED
ARMOUR STONE
RETAINING WALL W/ GUARD
SNOW STORAGE
NEW ASPHALT DRIVEWAY TWO WAY
31.729 m
BUILDING LENGTH
NEW RETAINING WALL W/ NEW BOARD FENCE
LINE OF BUILDING ABOVE
LINE OF CANOPY ABOVE
EX. CURB
EX. CB
EX. PARKING ENT.
EX. PAD MOUNTED TRANSFORMER TO BE REPLACED
EX. BOARD FENCE
PROPOSED BIKE RACKS (X 7), 46 SPACES W/ PERMEABLE PAVERS
EX. PARKING ENT.
EX. TYPE B LOADING SPACE, SERVICE ACCESS, GARBAGE PICKUP, TEMPORARY SNOW STORAGE
SPRUCE STREET
EX. HYDRO POLE
EXISTING FIRE HYDRANT
EX. SIDEWALK
PLANTED AREA
VISITOR PARKING 2 SPACES
EX. PARKING ENT.
EX. CURB
EX. CB
EXISTING ASPHALT DRIVEWAY
SETBACK LINE
EX. CURB
EX. CB
PROPOSED 4 BIKE PARKING/W PERMEABLE PAVERS
PROPOSED 5 BIKE PARKING W/ PERMEABLE PAVERS
DRIVEWAY ENT.
Ex. BELL PEDESTAL
EX. HYDRO POLE
FLANKAGE YARD
EASEMENT LINE
EXISTING CONC. WALKWAY
CONCRETE WALKWAY
EX. BELL + PEDESTAL
PARKING EXHAUST GRATE
EXTENT OF UNDERGROUND PARKING
BUILDING WIDTH
18.229 m
SETBACK LINE
EASEMENT LINE
ELEC. ROOM
1.000 m
CONC. WALKWAY
1.640
WW
6.000 m
1.500 m
1.500 m
R 3.094
4.250 m
R 9.000
7.761 m
R 9.000
5.062 m
R 9.000
4.908 m
1.640
1.000 m
1.000 m
1.000 m